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July 6, 2005

U.S. Patent & Trademark Office
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To Whom It May Concern:

Enclosed please find documents listed below that were mailed to our firm; these documents do not appear to belong to us:

10/516,395	Filing Receipt/Notice of Acceptance of Application
10/617,643	Office Action Summary

Thank you,

Justin Lancaster
U.S. Docketing Clerk
(949)721-5273

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,643	07/11/2003	Alok Mani Srivastava	121368	4158

20995 7590 06/22/2005

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EXAMINER	
HANNAHER, CONSTANTINE	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/617,643	SRIVASTAVA ET AL.	
	Examiner	Art Unit	
	Constantine Hannaher	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-17* is/are rejected.

7)☒ Claim(s) *1,18 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20030711*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. As set forth in MPEP § 609:

> 37 CFR 1.98(b) requires that each item of information in an IDS be identified properly. U.S. patents must be identified by the inventor, patent number, and issue date. U.S. patent application publications must be identified by the applicant, patent application publication number, and publication date. U.S. applications must be identified by the inventor, the eight digit application number (the two digit series code and the six digit serial number), and the filing date. If a U.S. application being listed in an IDS has been issued as a patent, the applicant should list the patent in the IDS instead of the application. Each foreign patent or published foreign patent application must be identified by the country or patent office which issued the patent or published the application, an appropriate document number, and the publication date indicated on the patent or published application. Each publication must be identified by publisher, author (if any), title, relevant pages of the publication, date and place of publication. The date of publication supplied must include at least the month and year of publication, except that the year of publication (without the month) will be accepted if the applicant points out in the information disclosure statement that the year of publication is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the particular month of publication is not in issue. The place of publication refers to the name of the journal, magazine, or other publication in which the information being submitted was published.

Note the application 10/314,986 has not been identified by inventor.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Note the use of "An aspect of the present invention is directed to" which can be implied.

Claim Objections

3. Claim 13 is objected to because of the following informalities: "hydrogen emitting compounds" should read --hydrogen bearing compounds-- or the like. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "element A" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 4 establishes element A not claim 3.

Claim 7 recites the limitation "the avalanche photodiode" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 6 establishes the avalanche photodiode not claim 5.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 14-17 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dorenbos *et al.* (1993).

With respect to independent claim 14, Dorenbos *et al.* discloses a method for detecting gamma radiation (from a ^{137}Cs source) comprising the steps of optically coupling a radiation detector (photomultiplier tube) to a scintillator material ($Y_3Al_5O_{12}:Pr^{3+}$) of the recited type (cubic garnet host and praseodymium activator with ultraviolet radiation emission), exposing the scintillator material to gamma ray radiation, and detecting with the radiation detector ultraviolet radiation emitted by the scintillator material in response to stimulating gamma ray radiation (pages 392-393).

With respect to dependent claim 15, the scintillator material in the method of Dorenbos *et al.* has the recited formula (when A is Y and B is Al, page 392).

With respect to dependent claim 16, the praseodymium in the method of Dorenbos *et al.* is present in a quantity within the claimed range (0.8 mol%, page 392).

With respect to dependent claim 17, the scintillator material in the method of Dorenbos *et al.* is a single crystal (abstract).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made

in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-5, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorenbos *et al.* (1993) in view of van Eijk *et al.* (1994).

With respect to independent claim 1, Dorenbos *et al.* discloses a system comprising a scintillator material ($Y_3Al_5O_{12}:Pr^{3+}$) of the type recited (cubic garnet host and praseodymium activator) and a scintillating radiation detector (photomultiplier tube) optically coupled to the scintillator material capable of detecting the ultraviolet radiation emitted by the scintillator material in response to stimulating gamma ray radiation (pages 392-393). Accordingly, Dorenbos *et al.* discloses every positive limitation of the recited system. The use of praseodymium activated cubic garnet host scintillators (of the type used in the system of Dorenbos *et al.*) to detect oil is suggested by van Eijk *et al.* in view of the identical scintillator in Table 2 (page 740) and the consideration of "detectors subject to special conditions, e.g. in satellites or bore holes" (page 739). That detectors below the surface of the earth as used by van Eijk *et al.* are subject to gamma ray radiation which occurs either naturally or is induced, and that this gamma ray radiation is representative of oil, is so well established as to require no citation. Accordingly, in view of the suitability of the scintillator material for a detector in a bore hole as identified by van Eijk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Dorenbos *et al.* to use the detector and the scintillator material below the surface of the earth. Consequently, the system of Dorenbos *et al.* as modified by the suggestion of van Eijk *et al.* constitutes a system for detection of oil.

With respect to dependent claim 2, the scintillator material in Dorenbos *et al.* has a primary decay time in the claimed range (page 392).

With respect to dependent claim 3, that gamma ray radiation below the surface of the earth is representative of a reaction such as reflection with hydrogen bearing compounds is so well established as to require no citation.

With respect to dependent claim 4, the scintillator material in the system of Dorenbos *et al.* has the recited formula (when A is Y and B is Al, page 392).

With respect to dependent claim 5, as best understood, the praseodymium in the system of Dorenbos *et al.* is present in a quantity within the claimed range (0.8 mol%, page 392).

With respect to dependent claim 11, the scintillator material in the method of Dorenbos *et al.* is a single crystal (abstract).

With respect to independent claim 13, Dorenbos *et al.* discloses a method comprising the steps of optically coupling a radiation detector (photomultiplier tube) to a scintillator material ($Y_3Al_5O_{12}:Pr^{3+}$) of the recited type (cubic garnet host and praseodymium activator with ultraviolet radiation emission), exposing the scintillator material to gamma ray radiation (from a ^{137}Cs source), and detecting ultraviolet radiation emitted by the scintillator material in response to stimulating gamma ray radiation with the radiation detector (pages 392-393). Although the exposure in the method of Dorenbos *et al.* may be presumed to be in a laboratory setting, the exposure of praseodymium activated cubic garnet host scintillators (of the type used in the method of Dorenbos *et al.*) to gamma ray radiation below the surface of the earth is suggested by van Eijk *et al.* in view of the identical scintillator in Table 2 (page 740) and the consideration of "detectors subject to special conditions, e.g. in satellites or bore holes" (page 739). Accordingly, in view of the suitability of the scintillator material for a detector in a bore hole as identified by van Eijk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Dorenbos *et al.* to comprise the step of lowering the detector and the scintillator material below

the surface of the earth. That detectors below the surface of the earth are subject to gamma ray radiation which occurs either naturally or is induced, and that this gamma ray radiation is representative of a reaction such as reflection with hydrogen *containing* compounds, is so well established as to require no citation. Consequently, the method of Dorenbos *et al.* as modified by the suggestion of van Eijk *et al.* constitutes a method for oil exploration.

11. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorenbos *et al.* (1993) in view of van Eijk *et al.* (1994) as applied to claim 1 above, and further in view of Suzuki (US004649276A).

With respect to dependent claim 6, although Dorenbos *et al.* discloses the coupling of a photomultiplier as the scintillating radiation detector, it is known in the art of coupling a scintillating radiation detector to a scintillator material as shown by Suzuki (Fig. **2**) to substitute for a photomultiplier **34** an avalanche photodiode (column 7, lines 14-21). Since the art recognizes the equivalent performance of an avalanche photodiode in detecting the emission from a scintillator material, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system suggested by Dorenbos *et al.* and van Eijk *et al.* such that the scintillating radiation detector was an avalanche photodiode.

With respect to dependent claim 10, although Dorenbos *et al.* do not mention the presence of an amplifier in the system, Suzuki *et al.* shows (Fig. **1**) that an amplifier **38** (column 4, lines 38-40) is routine in a system with a scintillator material and a scintillating radiation detector. In view of the utility in amplifying signals from a scintillating radiation detector for use by subsequent processes (as output through terminal **42**), as would be well known in the art, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system suggested by Dorenbos *et al.* and van Eijk *et al.* such that it further comprised an amplifier.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorenbos *et al.* (1993) in view of van Eijk *et al.* (1994) and Suzuki (US004649276A) as applied to claim 6 above, and further in view of Uddin *et al.* (US005581087A).

With respect to dependent claim 7, as best understood, while Suzuki suggests avalanche photodiodes without mandating a particular material, Uddin *et al.* discloses that SiC is known for its suitability in photodiodes which detect the ultraviolet radiation from phosphors. In view of the suitability of SiC in detecting the scintillation radiation in the wavelength range emitted from the scintillator material suggested by Dorenbos *et al.* and van Eijk *et al.* it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system suggested by Dorenbos *et al.* and van Eijk *et al.* and Suzuki to specify that the avalanche photodiode substituting for the photomultiplier was of silicon carbide.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorenbos *et al.* (1993) and van Eijk *et al.* (1994) as applied to claim 1 above, and further in view of Uddin *et al.* (US005581087A).

With respect to dependent claim 8, van Eijk *et al.* recognize the need for "some ruggedness" (page 739) but do not specify an operating temperature range. Uddin *et al.* teaches that it is routine to expect a system with a scintillator material and a scintillating radiation detector to operate in a temperature range which encompasses the claimed range (column 3, lines 53-56). In view of the known range of temperatures in a bore hole, an industry in which van Eijk *et al.* expects the suggested system to be useful, and the demonstrated capability for operating in that range as shown by Uddin *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the system suggested by Dorenbos *et al.* and van Eijk *et al.* was capable of operating at temperatures within the claimed range.

14. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorenbos *et al.* (1993) in view of van Eijk *et al.* (1994) as applied to claim 1 above, and further in view of Kaifu *et al.* (US006528796B1).

With respect to dependent claim 9, although Dorenbos *et al.* describes a coupling of the scintillator material to the scintillating radiation detector (page 392) the interposition of a lens for focusing the emitted radiation from a scintillator material on a radiation detector is known from Kaifu *et al.* (Fig. **2** in view of lens array **301**, scintillator **401**, and detector **101**). In view of the advantages described by Kaifu *et al.* (column 5, line 48 to column 6, lines 5) it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system suggested by Dorenbos *et al.* and van Eijk *et al.* to further comprise a lens between the scintillator material and the scintillating radiation detector.

Allowable Subject Matter

15. Claims 12, 18, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter: the substitution of specifically lutetium for the yttrium used by Dorenbos *et al.* and van Eijk *et al.* is not suggested.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nikl *et al.* (2005) shows that the exact scintillator material recited in claims 12 and 18 has been, subsequent to the filing date, reported in the literature. The lower dependence of emission intensity with temperature (page R6) would be a reason to substitute lutetium for yttrium. Czirr *et al.*

(US005483062A) discloses a praseodymium activated lanthanide beryllate scintillator in a system for detection of oil.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ch

/Constantine Hannaher/
Constantine Hannaher
Primary Examiner

FORM PTO-1449 (REV. 7-80) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO.: 61765.005013	SERIAL NO: Unassigned 10/617643
LIST OF MATERIALS CITED BY APPLICANT	INVENTOR'S NAME: Alok Mani Srivastava et al.	EXAMINER: Unassigned
(Use several sheets if necessary)	FILING DATE:	GROUP: Unassigned

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE
CH	1	5,484,750 A	1/16/96	Greskovich et al.			
CH	2	6,093,347 A	7/25/00	Lynch et al.			
CH	3	6,246,744 B1	6/12/01	Duclos et al.			
CH	4	6,358,441 B2	3/19/02	Duclos et al.			

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION Y	TRANSLATION N

OTHER MATERIALS (Including Author, Title, Date, Pertinent Pages, Etc.)

	1	"On the Luminescence of Hafnium Compounds," by W. J. Schipper, J. J. Piet, H. J. De Jager and G. Blasse, *Mat. Res. Bull.*, Vol. 29, pp. 23-30 (1993)
	2	"Fast Scintillators and Their Applications," by Carel W. E. van Euk, *Nucl. Tracks Radiat. Meas.*, Vol. 21, No. 1, pp. 5-10 (1993)
	3	"Scintillation and Spectroscopic Properties of CE^{3+}-doped $YalO_3$ and $Lu_x(RE)_{1-x}AlO_3$(RE=Y^{3+} and Gd^{3+}) Scintillators," by J.A. Mares et al., *Nuclear Instruments and Methods in Physics Research*, A498, pp. 312-327 (2003)
	4	"Fluorescence and Structure of Barium Zirconium Trisilicate," by G. Blasse and A. Bril, *Journsel of Solid State Chemistry*, Vol.. 2, pp. 105-108 (1970)
CH	5	"The Luminescence of Pr^3 in Garnet Phosphors," by D. J. Green et al., Abstract No. 404, *Extended Abstracts*, Vol. 85-2, Fall Meeting ~~(1985)~~ (October 1985)

EXAMINER CONSTANTINE HANNAHER DATE CONSIDERED JUN 17 2005

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Notice of References Cited	Application/Control No. 10/617,643	Applicant(s)/Patent Under Reexamination SRIVASTAVA ET AL.	
	Examiner Constantine Hannaher	Art Unit 2878	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,528,796 B1	03-2003	Kaifu et al.	250/370.11
	B	US-5,581,087 A	12-1996	Uddin et al.	250/370.11
	C	US-5,483,062 A	01-1996	Czirr et al.	250/256
	D	US-4,649,276 A	03-1987	Suzuki, Arata	250/370.11
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
X	U	M. Nikl et al., "Photo- and radioluminescence of Pr-doped Lu3Al5O12 single crystal" phys. stat. sol. (a) vol. 202, no. 1, pp. R4-R6 (January 2005).
X	V	C.W.E. van Eijk et al., "Nd3+ and Pr 3+ Doped Inorganic Scintillators" IEEE Trans. Nuc. Sci., vol 41, no. 4, pp. 738-741 (August 1994).
X	W	P. Doenbos et al., "Scintillation properties of some Ce3+ and Pr3+ doped inorganic crystals" IEEE Trans. Nuc. Sci., Vol. 40, no. 4, pp. 388-394 (August 1993).
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.